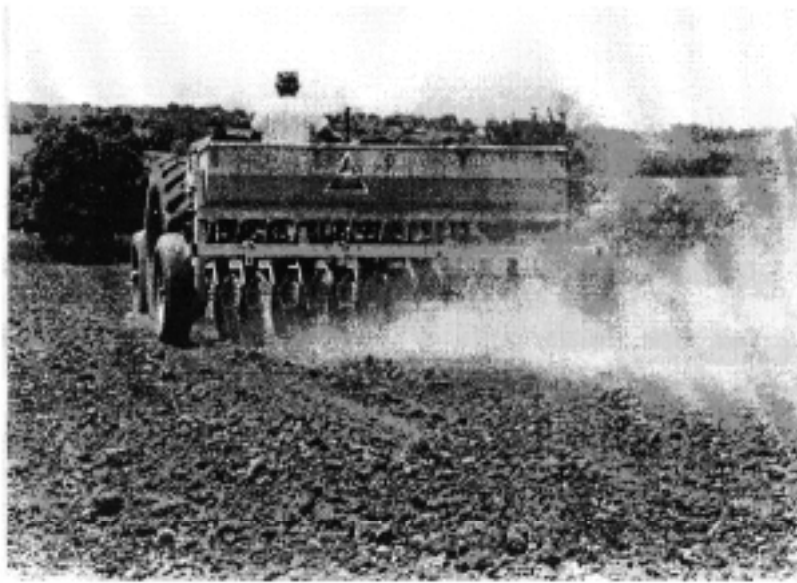


Establishing Native Warm-Season Grasses



Native warm-season grasses (nwsg) can be easily established by following a few details that are different from establishing cool-season grasses.

Buying Seed

Nwsg seed costs more than cool-season grass or legume seed because it yields less seed per acre and costs more to harvest, clean, and warehouse. Prices also fluctuate with supply and demand. Cost per acre may seem high but establishment success averages 95-98% if proper steps are followed so reseeding is rarely necessary. Stands will thicken from seed and vegetative spread if managed correctly.

Nwsg seed should be purchased in Pure Live Seed (PLS) amounts because it is typically lower purity than cool-season grass seed. PLS is the seed that grows minus the stems, leaves, and dead seed. PLS is determined by multiplying the percent purity (P) by the percent germination (G) plus firm seed (F); $PLS = P(G + F)$. Percent purity, germination and firm seed, and total percent PLS are usually listed on the seed tags or the invoice. Check your calculation by dividing the pounds of pure live seed purchased, as shown on the invoice, by the pounds of bulk seed shipped. This is often the easier method of determining the PLS of a mixture than calculating the PLS for each species. Divide the PLS percentage by 100 to form a decimal (e.g. $65\%/100 = .65$) then divide it into the desired PLS seeding rate (e.g. 8) to get the bulk seeding rate per acre ($8/.65 = 12$ bulk pounds/ac.).

Check this calculation by dividing the bulk amount of seed shipped, as shown on the invoice, by the number of acres to be planted, (e.g. $120 \text{ bulk pounds} \div 10 \text{ acres} = 12 \text{ bulk pounds/ac.}$). If these figures don't agree, check your calculations, check your order, or check the acres for which you ordered seed.

Seeding Rates

Seeding rates for monocultures (pure stands) and mixtures are shown in Table 1. Monocultures are normally planted for seed production (at significantly lower rates than for haying and grazing) or for species, such as switchgrass, that mature earlier than other nwsg. Mixtures of species with relatively close maturity dates are planted for pasture, hay, erosion control, and wildlife habitat. Only a few of the potential combinations are shown in Table 1. Nwsg are not normally planted with cool-season grasses except when quicker cover afforded by cool-season grasses is needed. A Missouri Department of Conservation (MDC) wildlife biologist or Natural Resources Conservation Service (NRCS) conservationist can develop a more complex mixture of compatible species.

Seeding Dates

Nwsg grow during the summer months like milo or corn, thus are usually planted in late spring or early summer. Dormant plantings may be made after December if the soil has thoroughly cooled. Increase the seeding rate 25 to 50% for dormant

seeding to compensate for seed that will be eaten by rodents or rot before spring, except when making prairie restoration plantings. For the latter, grass rates are lowered to reduce competition for native wildflowers.

Fertilizer

Soil test and apply needed phosphorus (P), potassium (K), and lime prior to seeding. A pH of 5.5 to 6.5 is preferred for nwsg. Some varieties, e.g. 'Aldous' little bluestem, may require a pH of at least 6.0. Do **not** apply nitrogen (N) except in combination with certain herbicides. Soil test and apply needed nutrients prior to the third growing season for top forage production. Proper grazing will remove little P & K but haying will remove large quantities and require annual amendments (see Managing NWSG for Missouri Stockmen).

Nwsg evolved in a low budget nitrogen environment. Small amounts of nitrogen was supplied by about thirty species of legumes and by growth and decay of soil microorganisms. Nitrogen may be supplied in nwsg plantings by fertilizing or from native or introduced legumes. Illinois bundleflower or partridge pea may be seeded with the grasses at 1/4 to 1/2 pound per acre. Bundleflower does not establish well after the nwsg have become established. Other native legumes which can be added are leadplant, slender lespedeza, roundhead lespedeza, purple prairie clover, and tick clover. These are usually seeded at lower rates due to high cost.

Most introduced legumes, e.g. red and white clover, are not compatible with nwsg because they begin growth too early and will reduce nwsg production. Alfalfa, birdsfoot trefoil, and annual lespedeza are more compatible with the growth cycle of nwsg. Birdsfoot trefoil should only be used in grazed plantings where livestock can help keep it from suppressing the nwsg. Alfalfa may be seeded with the grasses at 3 lb./ac. and birdsfoot at not more than 1 1/2 lb./ac. Annual lespedeza (Korean, Kobe, or Marion) should not be planted at the same time as the nwsg seed, but up to 5 lb./ac. may be added prior to the third or fourth growing season. Broadcast or drill annual lespedeza in February, if a burn is not planned, or after the burn.

In the absence of a soil test and legumes, annual top dressing of N-P-K at 40-30-30 in mid-May will increase production. Nitrogen uptake by the nwsg is better and fewer problems will occur from cool-season competition if nitrogen is applied in years the planting is burned. Nitrogen should not be used in an attempt

to restore nwsg that have been severely weakened by improper management. They should be rested one half to a full summer to restore vigor before adding N.

Seedbeds

Nwsg may be planted into clean-tilled seedbeds or killed sods. Clean-tilled seedbeds should be fine textured and firm, preferably rolled. Several methods work well.

1) Plow deep in late fall to put weed seeds too deep to sprout. Disk shallow in the spring to keep from bringing up weed seeds and to kill sprouted weeds. Roll or harrow 2-3 times prior to planting. On soils too shallow to plow, substitute heavy disking. If a fescue sod is being converted, kill it with a proven herbicide such as glyphosate (Roundup), sulfosate (Touchdown), and/or imazapic (Plateau) (See Guidelines for Converting Tall Fescue), or grow a cultivated crop for at least two years.

2) Nwsg seed may also be planted into corn, milo, or soybean stubble left standing from the previous year. Mow the stubble to 4-6 inches shortly before or soon after seeding. This will provide better erosion control on highly erosive ground but the field may retain the roughness of the crop rows making mowing or haying more difficult. Nwsg are intolerant of crop herbicides containing imazaquin (Scepter, etc.) so pay attention to herbicide history. A cover crop of oats may also be planted in the fall on erosive soils and the nwsg seed drilled or broadcast into the standing residue during the winter or spring. Planting into green wheat in late winter or early spring has been successful but use a variety of wheat that is not allelopathic. Harvest the wheat for hay, rotary mow after the boot stage, or cut for grain. Redtop, timothy, or perennial ryegrass may also be planted with the nwsg to provide cover while the nwsg is getting established.

3) Nwsg may be planted on killed cool-season grass sods using a rangeland or no-till drill capability of handling chaffy or bearded seed (except switchgrass which will flow through a standard legume box, or eastern gamagrass which will flow through a standard grain box or corn planter). An air-spreader followed by rolling also works well. The sod must be killed with Roundup, Touchdown, or Plateau (see Guidelines for Converting Tall Fescue). In some instances, a forage sorghum or sudangrass crop helps kill residual fescue tillers before the nwsg is planted. Eastern gamagrass, big bluestem, and switchgrass may also be planted with a companion crop of corn at a reduced corn population.

Planting Methods

Planting should be either by drilling, air spreading, or broadcasting. Switchgrass seed is small, dense, and free flowing like clover, Eastern gamagrass is large like corn kernels. Big bluestem, little bluestem, Indian grass, and side-oats grama are chaffy, hairy, and/or awned making them more difficult to handle.

Debearding improves handling quality of chaffy seed, particularly in conventional grain drills, but increases cost and a carrier may still be required to prevent lodging over the seed cup or plugging in the seed tubes or shoe. Seed depth should be no more than 1/4" to 1/2" for all nwsg except eastern gamagrass. Eastern gamagrass should be seeded at 1' depth. Some Soil and Water Conservation Districts (SWCD), MDC regions, and Quail Unlimited chapters have drills capable of handling chaffy or debearded seed. Remember, however, chaffy seed will not flow through a conventional drill and debearded seed will flow too fast through a drill designed to handle chaffy seed so find a drill before ordering the seed.

Air spreaders normally require debearded seed and 70 to 100 pounds/acre of phosphorus (P) and potash (K) or pelleted lime for efficient operation. Cyclone fertilizer spreaders may use either chaffy or debearded seed but are more efficient with debearded seed. Use 120 pounds P&K fertilizer, oats, or cracked corn to aid spreading and prevent lodging in the hopper. Set the spreader for 60 lbs./ac. and cover the field twice, splitting the width of the first passes on the second trip. Roll with a corrugated roller or cultipacker when finished. **Do not disk or harrow** to cover the seed.

Management During Establishment

Weeds, especially grassy weeds such as giant foxtail, should not be allowed to grow more than 18 inches tall before mowing. Mow to a stubble of 4 to 6 inches the first time, 6-8 inches the second time, and slightly higher if a third mowing is necessary. Cease mowing after early August to avoid disrupting root carbohydrate storage of the native grasses.

Brief off-and-on grazing, call "flash grazing", can be an effective substitute for mowing weeds. The objective is to have cattle eat the tender weeds such as foxtail, crabgrass, and pigweed, but not graze the developing nwsg grass seedlings. Stock with a number of animals that will consume the weeds in one or two days, then remove the animals. Repeat the process each week but **stop by August 1 and never graze more than two days per week.**

Herbicides labeled for use on native warm-season grasses, e.g. Plateau and Pursuit, can greatly

accelerate the rate of establishment, and reduce the need for weed-control mowing. Check Extension, USDA, or MDC offices to see what is currently labeled for nwsg. Annual grasses are the main concern. Broadleaf weeds are rarely a serious problem but may easily be controlled with a timely mowing or 2,4-D herbicide if **nwsg seedlings are past the 4-5 leaf stage and if native prairie forbs were not included in the planting mixture.**

Second Year Management

Native warm-season grasses are still developing this year and should not be pressed for production. Prescribed burning is not normally recommended until plants are two years old because winter-heaving can expose the crowns and rhizomes of young grasses to fire injury. Also, the grasses are rarely well enough developed to respond to the improved growing conditions following the burn more than can competing weeds. Mare's tail, common ragweed, heath aster and a few other broadleaf weeds may need to be mowed in late May or early June to prevent them from overtopping the young grasses. A weedy cutting of hay or light grazing may be substituted for mowing but should not be done after July 15. NWSG store carbohydrates in their roots in the late summer and fall for winter survival and to initiate spring growth. They need plenty of leaf area for photosynthesis. Some grasses and forbs may also produce seed this year which will help thicken the stand.

Third Year Management

Native warm-season grasses may still only be at 80% of production potential this year may be hayed or moderately or rotationally grazed.

Native warm-season grasses evolved with fire, are well adapted to tolerate it, and respond to the improved growing conditions that follow fire. They may be managed without periodic burning but they will struggle against exotic and native weeds, tree invasion, and accumulations of their own waste. Following spring burning, the soil is warmer and drier resulting in earlier and more rapid growth. Summer burns, in effect, are similar to haying and brief, close grazing. They rarely cause long term damage unless conditions are very dry at the time of a burn. Fall and winter burns may create dry, and crusted soil conditions which can reduce total grass production. This may not be desirable for forage production but may improve wildlife habitat, aesthetic or landscape plantings in which extremely tall grasses and heavy grass production is not warranted.

Table 1. Seeding rates for native warm-season grasses. Rates are pounds of Pure Live Seed (PLS)/acre.

Grass Species (Variety or Origin)	Monocultures		Sample Mixtures**	
	Good seedbeds	Fair* seedbeds	A	B
Big Bluestem (Kaw, Rountree, MO Native)	8.0	12.0	2.5	2.0
Indiangrass (Osage, Rumsey, Cheyenne, MO Native, Nebraska 54, Oto)	7.8	11.7	2.5	2.0
Little Bluestem (Aldous, Camper, MO or KS Native)	6.4	7.8	1.0	1.5
Sideoats Grama (El Reno, Trailblazer)	7.5	11.2	0.5	0.5
Eastern Gamagrass (Pete, IUKA IV, Shepherd's PMK-24)	8.0	12.0	1.0	1.0
Switchgrass--Forage (Cave-in-Rock, Trailblazer, Alamo, Blackwell)	4.7	7.0	0.5	
Switchgrass--Levees, Flood Areas, Erosion Control (Kanlow, Alamo, Cave-in-Rock, Blackwell)	7.0	14.0		
Canada or Virginia Wildrye (nat. cool-season grass)	10.0	12.0		1.0
Native Prairie Forbs			0.25	0.25
TOTAL			8.25	8.25

*Fair is for very coarse seedbeds or broadcast seeding without cultipacking.

**Custom mixtures may be developed by multiplying the monoculture seeding rate by the desired percentage of each component.

Seed Sources for ❖nwsg and ❖❁nwsg & forbs:

- ❖Bamert Seed Co., Rt. 3, Box 1120, Muleshoe, TX 79347-1120, Phone: 1-800/262-9892
- ❖❁Hamilton Seeds, HCR 9, Box 138, Elk Creek, MO 64456, Phone: 417/967-2190
- ❖J&J Seed Co., Rte. 3, Gallatin, MO 64640, Phone: 660/663-3165
- ❖Miller Grass Seed Co., Inc., Box 81823, Lincoln, NE 68501, Phone: 402/438-1232
- ❖❁Siemer Enterprises, 300 Collinville Rd. East St. Louis, IL 62201, Phone: 1-800/467-7333
- ❖Osenbaugh Grass Seeds, Rt. 1, Box 106, Lucas, IA 50151, Phone: 515/766-6476

❖❁Sharp Bros Seed Co. of Missouri, 396 S.W. Davis Street-Ladue, Clinton, MO 64735-9058, Phone 660/885-7551

❖❁Stock Seed Farms, Box 112, Murdock, NE 68407, Phone: 402/867-3771

Other Native Grass Brochures from the MO Dept of Conservation:

- ❖Native Grasses
- ❖Native Warm-Season Grasses for Missouri Stockmen
- ❖Native Warm-Season Grasses for Wildlife